

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the subject application. The Office Action of June 28, 2004 has been received and its contents carefully reviewed.

By this Amendment, Applicant amends claims 1, 27, 31 and 35, and cancels claim 30 without prejudice or disclaimer. Accordingly, claims 1-24, 27-29, 31-33, 35-41 and 43-78 are currently pending in the present application. Reexamination and reconsideration of the application are respectfully requested.

In the Office Action, the Examiner objects to claim 30 because claim 30 allegedly is not further limiting. Applicant hereby cancels claim 30. Accordingly, Applicant respectfully requests the withdrawal of this objection.

In addition, the Examiner rejected claims 1-12, 35-37, 49-54 and 73-78 under 35 U.S.C. § 103(a) as being unpatentable over Cervantes et al. (U.S. Patent No. 6,379,985) in view of Hashimoto et al. (U.S. Patent No. 6,564,445) and Tomomura et al. (U.S. Patent No. 5,103,269); rejected claims 14-24, 38-41, 43-48 and 55-60 under 35 U.S.C. § 103(a) as being unpatentable over Cervantes et al. in view of Back et al. (U.S. Patent No. 6,242,276) and Tomomura et al.; rejected claims 13, 27-33 and 61-72 under 35 U.S.C. § 103(a) as being unpatentable over Cervantes et al. in view of Hashimoto et al., Tomomura et al. and Back et al. Applicant respectfully traverses this rejection.

The rejection of claims 1-12, 35-37, 49-54 and 73-78 under 35 U.S.C. § 103(a) as being unpatentable over Cervantes et al. in view of Hashimoto et al. and Tomomura et al. is respectfully traversed and reconsideration is requested.

Claim 1 is allowable over the cited references in that claim 1 recites a combination of elements including, for example, “reducing a surface roughness of the transparent substrate using a dry etching method, wherein the surface roughness and refractive index of the transparent substrate are such that the surface of the transparent substrate forms an escaping angle for photons; forming a reflective layer on a second side of the transparent substrate...” None of the cited references, singly or in combination, teaches or suggests at least these features of the claimed invention.

An example of support for the above feature is disclosed in paragraph [0032] of the present application. By having such a surface that is in contact with a reflective layer, an LED device according to the present invention can increase light output “as much as a factor of four without a substantial increase in production cost.” Accordingly, Applicant respectfully submits that claim 1 and claims 2-12 and 49-54, which depend therefrom, are allowable over the cited references.

In addition, Applicant respectfully submits that there is no motivation for one of ordinary skill to combine the cited references and arrive at the claimed invention with any reasonable expectation of success. As best understood, Hashimoto et al. teaches a magnetic head. Therefore, Applicant respectfully submits that Hashimoto et al. involves non-analogous art for the purpose of analyzing the obviousness of the subject matter at issue. Applicant further respectfully submits that the motivation to combine the references comes from the present invention and not from the cited references, which is impermissible.

Claim 35 recites a combination of elements that includes “reducing a surface roughness of the substrate using inductively coupled plasma reactive ion beam etching, wherein the surface roughness and refractive index of the substrate are such that the surface of the substrate forms an escaping angle for photons; forming a reflective layer on a second surface of the substrate...” None of the cited references, singly or in combination, teaches or suggests at least this feature of the claimed invention. Accordingly, Applicant respectfully submits that claim 35 and claims 36-37 and 73-78, which depend therefrom, are allowable over the cited references.

The rejection of claims 14-24, 38-41, 43-48 and 55-60 under 35 U.S.C. § 103(a) as being unpatentable over Cervantes et al. in view of Back et al. and Tomomura et al. is respectfully traversed and reconsideration is requested.

Claim 14 is allowable over the cited references in that claim 14 recites a combination of elements including, for example, “forming an n-type layer and a p-type layer on a substrate, wherein the substrate includes sapphire” and “forming a scribe line on the substrate using inductively coupled plasma reactive ion beam etching.” None of the cited references, singly or in combination, teaches or suggests at least these features of the claimed invention.

Applicant respectfully submits that to establish a prima facie case of obviousness under

35 U.S.C. § 103, the prior art references when combined must at least teach or suggest all the claim elements. Although Back et al. may teach forming small grooves using an ICP-RIE, such grooves are formed in the polished silicon layer 111, not the glass substrate 112. In the present application, the scribe line is formed on the substrate to separate the LED chips using a dry etching method to increase the number of LED chips that can be manufactured from one substrate. See paragraph [0053] of the present application. Accordingly, Applicant respectfully submits that claim 14, and claims 15-24 and 55-60, which depend therefrom, are allowable over the cited references.

As discussed with respect to claim 35, since Back et al. fails to cure the deficiencies of Cervantes et al. and Tomomura et al., claim 38 is allowable over the cited references.

Claim 39 is allowable over the cited references in that claim 39 recites “forming a first epitaxial layer on a first surface of a substrate...wherein the substrate further includes sapphire...and forming a scribe line on one of the first and second surfaces of the substrate to separate the plurality of diodes using inductively coupled plasma reactive ion beam etching.” As stated, none of the cited references, singly or in combination, specifically teach or suggest forming a scribe line on a surface of a sapphire substrate using inductively coupled plasma reactive ion beam etching. Thus, Applicant respectfully submits that claim 39 and claims 40, 41 and 43-48, which depend therefrom, are allowable over the cited references.

The rejection of claims 13, 27-33 and 61-72 under 35 U.S.C. § 103(a) as being unpatentable over Cervantes et al. in view of Hashimoto et al., Tomomura et al. and Back et al. is respectfully traversed and reconsideration is requested.

As discussed with respect to claim 1, since Back et al. fails to cure the deficiencies of Cervantes et al., Hashimoto et al. and Tomomura et al., claim 13 is allowable over the cited references.

Claim 27 recites a combination of elements including, for example, “reducing a surface roughness of the transparent substrate using a dry etching method, wherein the surface roughness and refractive index of the transparent substrate are such that the surface of the transparent substrate forms an escaping angle for photons...” As state above, none of the cited references, singly or in combination, specifically teach or suggest these features. Therefore, Applicant

respectfully submits that claim 27 and claims 28-30 and 61-66, which depend therefrom, are allowable over the cited references.

Claim 31 is allowable over the cited references in that claim 31 recites, among other things, "reducing a surface roughness of the transparent substrate using inductively coupled plasma reactive ion beam etching, wherein the surface roughness and refractive index of the transparent substrate are such that the surface of the transparent substrate forms an escaping angle for photons; forming a reflective layer on a reduced surface of the transparent substrate..." None of the cited references, singly or in combination, specifically teach or suggest these features. Accordingly, Applicant respectfully submits that claim 31 and claims 32-33 and 67-72, which depend therefrom, are allowable over the cited references.

Applicant believes the application is in condition for allowance and early, favorable action is respectfully solicited. If the Examiner deems that a telephone conference would further the prosecution of this application, the Examiner is invited to call the undersigned attorney at the telephone number (202) 496-7500. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

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Respectfully submitted,

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